CLAIMS:

1. Controller having a switchable performance characteristic, comprising:

a first input for receiving an error signal;

an output for generating an actuator drive signal;

the controller being capable of operating in a first operative mode with a first performance characteristic in a first range of error signal values;

the controller being capable of operating in a second operative mode with a second performance characteristic in a second range of error signal values;

wherein said first range and said second range have an overlap [T_{LL}-T_N];

the controller being switchable from first operative mode to second operative mode and vice versa for an error signal value in the said overlap.

2. Controller according to claim 1, wherein said second range of error signal values has a lower limit threshold which preferably is approximately zero.

3. Controller according to claim 1 or 2, wherein said first range of error signal values has an upper limit threshold.

4. Controller according to claim 3, wherein said upper limit threshold corresponds to a transition point where the first characteristic intersects the second characteristic.

5. Controller according to any of the previous claims, wherein the controller is designed to select either its first operative mode or its second operative mode on the basis of a combination of an input error signal and a velocity signal.

6. Controller according to claim 5, wherein the controller comprises a second input for receiving an input velocity signal.

7. Controller according to claim 5 or 6, wherein the controller comprises a calculating unit having an input coupled to the error signal input of the controller, and being designed for calculating a first time-derivative $\nu = d\epsilon/dt$ and for providing at an output an output signal representing said first time-derivative ν.

8. Controller according to claim 7, wherein the controller comprises a switch having a first input connected to the output of the calculating device, having a second input connected to the second input of the controller, and having an output optionally connectable to either the first input or the second input.

9. Controller according to any of the claims 5-8, wherein the controller is designed to compare a predetermined combination of an input error signal and said velocity signal with a predetermined threshold level.

10. Controller according to claim 9, wherein said predetermined combination of error signal and velocity signal is a summation Σ calculated in accordance with the formula

$$\Sigma = \epsilon + K \cdot \nu^2.$$

11. Controller according to claim 10, wherein $K = 1/(2a_{max})$, a_{max} being a maximum attainable acceleration value.

12. Controller according to claim 9, 10 or 11, wherein said predetermined threshold level corresponds with a predetermined error limit value.

13. Controller according to claim 5 or 6, further comprising:

- a first controller unit having an input connected to said first input and having an output providing an output signal $S1(\epsilon)$, the first controller unit having a first characteristic;
- a second controller unit having an input connected to said first input and having an output providing an output signal $S2(\epsilon)$, the second controller unit having a second characteristic;
- a controllable switch unit having a first input coupled to the output of the first controller unit, a second input coupled to the output of the second controller unit, a control input, and an output coupled to the controller output;

wherein the controllable switch unit can be operated in a first operative state wherein its output is coupled to its first input, and in a second operative state wherein its output is coupled to its second input;

the controllable switch unit being responsive to a control signal received at its control input to selects said first operative state or said second operative state.

14. Controller according to claim 13, wherein the first controller unit is implemented as a proportional controller, or a PI-controller, or a PD-controller, or a PID-controller; and wherein the second controller unit is implemented as a proportional controller, or a PI-controller, or a PD-controller, or a PID-controller.

15. Controller according to claim 13 or 14, further comprising a processor unit having a first input coupled to said first controller input, and having an output coupled to said control input of said controllable switch unit.

16. Controller according to claim 15, wherein said processor unit is capable of generating its output signal having a first predetermined value if $\Sigma > T_L$ applies, and wherein said processor unit is capable of generating its output signal having a second predetermined value if $\Sigma < T_L$ applies, in which:

T_L is a predetermined threshold level;

$\Sigma = \epsilon + K \cdot \nu^2$, in which:

ϵ is a signal received at the first controller input;

ν represents the first time-derivative $d\epsilon/dt$;

$K = 1/(2a_{max})$, in which:

a_{max} is a maximum attainable acceleration value.

17. Controller according to claim 16, wherein said processor unit comprises a calculating unit having an input coupled to the first input of the processor unit, and being designed for calculating a first time-derivative $\nu = d\epsilon/dt$ and for providing at an output an output signal representing said first time-derivative ν.

18. Controller according to any of claims 15-17, as far as depending on claim 6, wherein said processor unit has a second input coupled to said second controller input, for receiving a signal representing said first time-derivative.

19. Controller according to claim 18, wherein said processor unit comprises a switch having a first input connected to the output of the calculating device, having a second input connected to the second input of said processor unit, and having an output optionally connectable to either the first input or the second input.

20. Controller according to any of claims 15-19, wherein said processor unit comprises a square calculator receiving a signal ν representing said first time-derivative and calculating ν^2, and a multiplier multiplying the output signal of said square calculator by a predetermined value.

21. Controller according to claim 20, wherein said processor unit comprises an adder having a first input coupled to said first input of said processor unit, and having a second input coupled to an output of said multiplier.

22. Controller according to claim 21, wherein said processor unit comprises a comparator having a first input coupled to an output of said adder, having a second input receiving said predetermined threshold level, and having an output coupled to the output of said processor unit.

23. Servo system for controlling the position of a movable object, comprising: a controller according to any of the previous claims;

a first detector capable of generating an error signal indicating a deviation between actual object position and target object position;

an actuator receiving a drive signal from said controller and operatively associated with said object to exert an object moving force under control of said control signal S.

24. Servo system according to claim 23, further comprising a second detector capable of generating a signal indicating a velocity of said object.

25. Optical disc drive comprising at least one movable optical component and a servo system according to claim 23 or 24 for controlling the actual position of said optical component.

26. Optical disc drive according to claim 25, wherein said optical component is an objective lens.

27. Optical disc drive according to claim 25, wherein said optical component is an optical head.